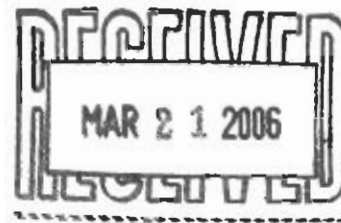


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Steven C. Harris, P.E.

March 20, 2006

Pat Page
Bureau of Reclamation
P.O. Box 640
Durango, Colorado 81302

Re: 1920 Act Report to Support USBR/PRID Contract

Dear Mr. Page:

The Contract being completed between the Bureau of Reclamation and the Pine River Irrigation District (PRID) describes the conditions under which PRID will provide Leased Water (defined in the Contract) from Vallecito Reservoir. As a condition of the Contract, a report is required by a professional engineer in Colorado describing how the Leased Water can be provided without being detrimental to irrigation in order to be in compliance with the "Act of February 25, 1920, 41 Stat. 451" (1920 Act). The attached report is my professional analysis of how the provision of Leased Water as defined in the Contract is in compliance with the 1920 Act.

Please contact me if you have any questions regarding the attached report.

Sincerely,

A handwritten signature in cursive script that reads "Steven C. Harris".

Steven C Harris
Colorado Professional Engineer, #14.303

Cc Hal Pierce, Manager PRID



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**REPORT ON THE PROVISION OF LEASED WATER FROM VALLECITO
RESERVOIR BEING IN COMPLIANCE WITH THE 1920 ACT
FOR INCLUSION IN CONTRACT NO.06-WC-40-710
MARCH 18, 2006**

1. INTRODUCTION

The Pine River Irrigation District (PRID) and the US Bureau of Reclamation (USBR) are negotiating Contract No. 06-WC-40-710 (Contract) which would describe the conditions of delivery and the repayment of Leased Water from Vallecito Reservoir (Vallecito) used for purposes other than irrigation.

Definition of Terms used in this Report and the Contract are listed below:

“Leased Water” is defined in the Contract (Section 1.(h)) to be “water that is actually contracted to Third Party Contractors, not including Standby Water, or is contracted under the “Minor Uses” Block for District and Federal charges. Leased Water may supply municipal, industrial, and miscellaneous uses.”

“Third Party Contract” means a contract between the District and a Third Party Contractor, pursuant to this Contract and subject to the approval of the United States, for the delivery of Leased Water.

“Minor Uses” water means those existing and future uses whose individual Leased Water allocation are equal to or less than 20 AF. Minor Uses will receive Leased Water in this Contract under the Minor Uses Block.

The Contract requires that providing Leased Water meet the provisions of the “Act of February 25, 1920, 41 Stat. 451” (1920 Act). The Contract states “This condition will be satisfied by a written report by a professional engineer specifying how use of this water will not impact irrigation.”

The 1920 Act states in part:

“Provided, That no such contract shall be entered into except upon a showing that there is no other practicable source of water supply for the purpose (*Provision #1*). Provided further, That no water shall be furnished for the uses aforesaid if the delivery of such water shall be detrimental to the water service for the irrigation project (*Provision #2*) or to the rights of any prior appropriator (*Provision #3*):”

This report is to provide documentation to show that Leased Water from Vallecito meets these three provisions in the 1920 Act.

2. AMOUNT OF LEASED WATER

The Contract proposes to allow up to 6,700 AF for Leased Water provided as follows: (1) 2,000 AF for Minor Uses of which 500 AF is existing and 1,500 AF is for future water needs; (2) up to 4,700 AF of water for Third Party Contracts of which 150 AF is existing usage, 850 AF is for use within the PRID service area, and 3,700 AF for future use and outside of the PRID service area. (The 150 AF of existing uses identified in (2) above is Leased water that currently is not bound by a Third Party Contract; however, under the terms and conditions of the Contract, Third Party Contracts would be required for these uses. Hence, it is referred to hereinafter as “existing Third Party Contracts”.)

For purposes of meeting the 1920 Act provisions as a prerequisite to finalizing the Contract, the existing 650 AF of Minor Use and Third Party Contract water and 2,350 AF of future Minor Use and Third Party Contract water, total of 3,000 AF, all of which will be used within the current PRID service area, as further explained in Section 3 below. The remaining 3,700 AF will be addressed for 1920 Act compliance as the Third Party Contracts are needed in the future. It is anticipated that much of this water (the remaining 3,700 AF) could be used outside of the current PRID service area as further explained in Section 4 (a) below.

The water by category is summarized in the following table.

500 AF existing Minor Use
<u>150 AF</u> existing Third Party Contracts
650 AF existing uses, 1920 Act Compliance Herein
1,500 AF future Minor Use
<u>850 AF</u> future Third Party Contracts
2,350 AF future uses, 1920 Act Compliance Herein
Total of 3,000 AF existing and future uses with 1920 Act Compliance Herein
3,700 AF future Third Party Contracts, 1920 Act Compliance at time of lease
6,700 AF total water in Contract

3. NO OTHER PRACTICABLE SOURCE OF WATER –Provision #1

PRID delivers water from Vallecito within a service area that includes the entire Pine River Basin, the lower Piedra River basin, and the Florida River basin east of the Florida River. Vallecito Reservoir is the only reservoir within the PRID service area that has the physical capability to provide the amount of Leased Water designated in the Contract. There is not sufficient direct flow water in either the Pine, Piedra, or Florida Rivers, especially during droughts, to meet the diversion requirements of the Leased Water. The Animas River is the only nearby river that has adequate flow during a drought to meet domestic demands but the Animas River is more than 10 miles away from the western edge of the PRID service area and prohibitively costly to construct and deliver water from that source to the PRID service area.

Given that the 3,000 AF of Leased water being addressed in this document is to be used entirely within the PRID service area, Vallecito Reservoir is the only practicable source of water to serve that need.

4. DETRIMENTAL TO WATER SERVICE FOR IRRIGATION – Provision #2

For the purposes of this evaluation, the derivation of how Leased Water would be made available was analyzed by both examining PRID's legal authority to allocate water and by quantifying the detriment, if any, to irrigation as a result of making Leased Water available.

(a) Legal Authority:

The PRID Board has the legal authority to allocate between irrigation and domestic water (Leased Water) without restriction as found in Colorado District Court, Case No. 03CV300, the Court stated:

“The Court therefore rules that the board of directors has the discretion to allocate water between domestic and irrigation uses without express approval of the shareholders.” And subsequently further stated: “The Court finds that PRID's board has no power to allocate water outside the district's boundaries except when authorized to do so by vote of the shareholders pursuant to CRS 37-42-135 or when the individual owners of the water rights being leased delegate their authority to lease their water to the board.”

The Court ruled the PRID board can allocate between irrigation and domestic (e.g. Leased Water) within PRID which implies the allocation is not detrimental to irrigation. The Court further determined that shareholders can voluntarily allow their water in PRID to be used for Leased Water outside of PRID.

As per the District Court ruling, allocating Leased Water outside of PRID will require either a vote of the shareholders or shareholders voluntarily pooling their water. A shareholder vote has not been requested at this time, but a group of shareholders has been formed to pool their PRID shares to be used outside of PRID. Therefore, any Leased Water outside of PRID will be provided voluntarily by owners of PRID Acres and will not impact any other shareholders. The amount of Leased Water outside of PRID could be up to one third (1/3) to one half (1/2) of the 6,700 AF available under the Contract. When the time comes to provide this Leased Water under the terms of the Contract, this water is expected to meet the provisions of the 1920 Act because it would be voluntarily provided by the shareholder pool.

(b) Quantification of Detriment to Irrigation:

The Pine River and its tributaries are the source of water supply for the lands in the PRID service area. The Pine River and its principal tributary, Vallecito Creek, rise in a rough mountainous region of the San Juan Mountains and flow in a general southerly direction to Vallecito, located at the head of the Pine River Project area. Vallecito provides irrigation storage water to the Pine River Project. From Vallecito, the Pine River flows south about 30 miles through the project lands to the Colorado-New Mexico State line and continues another mile or two to Navajo Reservoir on the San Juan River.

The Pine River is primarily snow-fed and consequently the greater portion of the runoff occurs as high spring flows, usually during the months of May and June. The stream flow decreases rapidly after the spring peak, and is usually at the lowest from November through March.

Vallecito is the only major reservoir in the project area and has regulated the streamflow since 1941. Vallecito has an active (useable) capacity of 125,400 AF and a maximum surface area of 2,720 acres. The mean annual inflow to Vallecito Reservoir for the 1941-2005 period of record was 268,500 af. The minimum annual inflow was recorded in 2002 at 74,500 AF, and the maximum annual inflow was in 1979 at 436,200 AF.

Vallecito is typically lowered through the irrigation season then begins to refill beginning in late September through the winter. Winter storage, however, is limited to 77,000 AF in order to prevent ice damage to the spillway's radial gates. Following the severe drought of 2002 and 2003, reservoir managers at Vallecito and in many other areas of western Colorado, have become more conservative in efforts to fill their reservoirs and storage of winter inflow is maximized to the extent possible in anticipation of possible low spring inflows.

Normally snowmelt and inflow begins to increase in April and more water is stored. Downstream irrigation begins about the first of May and some inflow into Vallecito is passed through to meet downstream senior irrigation water rights. Peak inflows and peak reservoir content generally occurs in the late May to July period. Following the runoff, when downstream irrigation needs cannot be met using reservoir inflow bypasses, a "call" is placed on the river, and Vallecito begins releasing storage water for downstream irrigation. This "call", determined by the Colorado Division of Water Resources, occurs when natural flows are insufficient to meet all water rights on the river and assures that the senior or older water rights receive full supplies before junior or newer water rights receive their water. Storage releases can continue into late October and occasionally early November.

As indicated previously, up to 650 AF of Vallecito water is now being used annually for Leased Water purposes and this water is released along with storage releases for irrigation. Mean monthly releases from Vallecito Reservoir have averaged 50 to 80 cfs in the winter and 600 to 1,000 cfs in the summer. Corresponding minimum monthly releases have been 6 cfs.

There are a series of private irrigation diversions on the Pine River, and immediately below some of these irrigation diversions flows on the Pine River can approach zero in summer months. Return flow replenishes the river below the diversions. Inflow to Navajo Reservoir, measured as mean monthly flows, has been as low as 6 cfs and as high as 2,000 cfs (Reclamation, 2000).

Ditch diversion records for the Pine River are maintained by the Colorado Division of Water Resources, Division 7 Engineer in Durango, Colorado. Downstream senior water rights total approximately 771 cfs.

Vallecito operations and streamflows will be essentially the same with or without provision of the Leased Water. 2,350 AF of irrigation water (650 AF of the 3,000 AF converted is already being used for M&I purposes) would be gradually converted over decades to Leased Water uses. Hydrology consequences were determined by overlaying the proposed alternative onto historical Vallecito operations and ditch diversions (i.e., demands) to show impacts. Since the historical Vallecito operations included the existing uses (up to 650 AF per year), only the additional 2,350 AF is addressed herein. Three primary assumptions were used in the hydrological analysis: 1) The entire 2,350 AF is being released for Leased Water purposes each year; 2) The entire 2,350 AF would be required to be "recaptured" each year prior to the beginning of the next year's irrigation season; and 3) The 2,350 AF would be released only during the period a call was being administered on the river (i.e., during irrigation season), similar to how the current 650 AF is administered.

It should be noted the assumption of fully using the 2,350 AF each year is conservative; releases would actually vary from zero to 2,350 AF depending on the length of the call period each year as described in the following paragraph.

The Leased Water would be released to the Pine River generally during the period of the irrigation season when there was a call on the river. Historically the period has ranged from 45 days to 150 days depending on river flow conditions; however, there have been years when there was no call in which case there was more than adequate water for all users and there was no impact on irrigation. If the 2,350 AF of Leased Water was fully developed, the Leased Water releases would normally vary between approximately 8 and 30 cfs, dependent upon the length of the call period. This would increase streamflows slightly to a point downstream of the last Leased Water diversion point, below which irrigation season streamflows should not change.

Vallecito content at the end of the irrigation season would be at worst 2,350 AF less than would occur without providing 2,350 AF of Leased Water. Return flow from the Leased Water upstream and downstream of Vallecito will replace as much as 50% to 90% of the 2,350 AF. Continuing to assume the entire 2,350 AF reduction in Vallecito content, this would normally represent a 1 to 2-foot reduction in reservoir service level but up to 4 feet in extremely dry years such as 2002.

As stated above, in this analysis it was assumed that the reduction in storage would need to be "re-stored" each year. Two methods for re-storing this water include:

- 1) First, historical non-irrigation season (November through April) releases could be reduced by an average of 6 cfs over the entire winter period. This would result in a reduction in the flow throughout the length of the river, although return flows from Leased Water would offset this reduction to a large extent. Table I summarizes the changes in reservoir releases under this scenario.

Table 1. Change in Historical Vallecito Reservoir releases, Method 1*

Month	Percentage change in mean release	Change in mean release (cfs)	Change in minimum release (cfs)	Change in maximum release (cfs)
January	-11%	-6	-6	-6
February	-10%	-6	-6	-6
March	-7%	-6	-6	-6
April	-3%	-6	-6	-6
May	<1%	-1	-2	-2
June	<1%	+3	+9	0
July	+1%	+8	+8	0
August	+2%	+10	+8	+2
September	+2%	+9	+4	+10
October	+3%	+7	+1	+11
November	-6%	-6	-6	-6
December	-8%	-6	-6	-6

* Note: The results shown in Table 1 assume that a 6 cfs reduction in the winter releases would always be possible. As indicated in Method 2 below, this is not always the case

- 2) Recognizing that some years, a 6 cfs reduction in the winter releases would not be possible (i.e., historical releases have been as low as 6 cfs), a second method for restoring the water released throughout the summer for Leased Water is a combination of reduced non-irrigation season releases and reduced historic operational releases. "Operational Releases" are defined as those releases necessary to reduce the storage content of the reservoir in anticipation of high spring runoff inflows or to obtain and maintain a storage content of less than 77,000 AF in the wintertime to avoid damage to the radial gates caused by ice buildup. In most years, Operational Releases in the fall are substantial in order to reach the winter storage target of 77,000 AF. "Over-Releases for Senior Water Rights" are defined as releases from Vallecito that are greater than 771 cfs and have historically occurred year round.

While some of these releases will continue to be necessary (i.e., reservoir storage levels will need to be reduced in anticipation of high spring runoff and to meet wintertime storage limits), the release volumes could be reduced by the amounts necessary to "re-store" water that has been or will be released for Leased Water. This would result in all or some of the water being "re-stored" during the non-winter months which would reduce the amount that would need to be "re-stored" in the winter months. Consequently, releases in the winter months would not have to be reduced as much as in Method 1.

Table 2 summarizes changes (as compared to historical operations) in Vallecito releases when the operational and over-releases are used to "re-store" the reservoir under the proposed action.

Table 2. Change in Vallecito Reservoir releases if fall Operational Releases

Month	Percentage change in mean release	Change in mean release (cfs)	Change in minimum release (cfs)	Change in maximum release (cfs)
January	-3%	-2	No Change	No Change
February	-3%	-2	No Change	No Change
March	-5%	-5	No Change	No Change
April	-3%	-6	No Change	No Change
May	-1%	-5	No Change	No Change
June	0%	-3	9	No Change
July	1%	8	8	No Change
August	2%	10	8	2
September	2%	9	4	10
October	3%	7	1	11
November	-13%	-13	No Change	-44
December	-6%	-4	No Change	No Change

Table 2 primarily shows that reductions in historic winter releases would be minimal in most years. However, there could be some years where reductions in historic winter releases would not be possible (i.e., if winter releases were at the minimum level already) and operational releases were not required (i.e. releases would not be necessary to reach 77,000 af). In these years, the water released for M&I purposes the previous year could not be made up prior to the next irrigation season. Historical records show that this would have occurred in two or more consecutive years only once in the 65 years of Vallecito Reservoir operations, 1962 and 1963. The amount of water that would have been released from storage during this time amounted to 4,500 af. Historically, throughout the 65 years of Vallecito Reservoir operations, storage in Vallecito has never dropped below 10.071 af. Thus, the volume of water necessary to release for M&I purposes would have still been available even in 1962-1963 without impacting the historical irrigation supply. In the third year (1964) of the analysis of historical data, the total volume of water that had been released for M&I purposes over the two year period was re-stored.

Based on this analysis, there appear to be no measurable impacts to hydrological resources or reservoir operations as a result of implementing the proposed action. Moreover, the impacts to hydrological resources identified in this analysis would likely be less than those described in this section when considering the following:

- The impact analysis does not take into account the mitigating effects of return flows on the system. Though not included in the analysis, an estimated 50% to 90% of the M&I water would return back to the rivers within the PRID existing service area which would significantly reduce the impacts to river flows.
- As mentioned above, the assumption in the analysis that the full 2,350 af of M&I water would be released each year is conservative; releases would actually vary from zero to 2,350 depending on hydrologic conditions.

- The volume of “over-releases” is likely greater than what was used in this analysis because there are times when the full 771 cfs of downstream senior water rights are not being diverted which would make additional water available to store in the reservoir. This would result in lower reductions in winter releases.
- The analysis assumes the Leased Water would be released only during the irrigation season. If a Third Party Contractor called for a year-round diversion, this could result in small increases in winter flows and small decreases in irrigation season flows (from those shown in Tables 1 and 2) in the reach of river upstream from the Pine River Canal diversion.
- The analysis does not take into account that irrigated acreage within PRID has been and continues to be reduced due to development such as homes, commercial buildings, farm buildings, roads, gas wells, and expansion of the Town of Bayfield. The reduction of the irrigated lands from 1945 to 2005 is roughly estimated to be 1,300 acres which represents approximately 2,700 AF of storage water that could be used for M&I purposes.

Summary of Impact on Irrigation of Leased Water

Providing Leased Water will not impact irrigation because:

- As described in the above section, there is always adequate water to meet the irrigation demands and provide Leased Water.
- The amount of Leased Water is not within the measurement accuracy of the flow gages used to account for the water. The measurement accuracy of typical water measurement structures (i.e., weirs, flumes, flow meters, etc.) is estimated to be 5%+- if the structure is well maintained (NRCS National Engineering Handbook – Irrigation Guide, 1997). Typically, the Leased Water is much less than 5% of the water being released from Vallecito.

(c) PRID Measures to Increase Leased Water Supply

Furthermore, land and water use trends in the area are resulting in less demand for irrigation water from Vallecito.

The irrigated land that PRID serves is continuing to change from large commercial irrigated farms to smaller tracts and subdivisions. When the land is subdivided the irrigated acreage that qualifies for PRID Acres is re-evaluated and a new certificate is issued with the current PRID Acres; each PRID Acre has one share in PRID. Normally there are less PRID Acres after the subdivision. The PRID Acres no longer needed on the original tract are returned to PRID which are then re-allocated half to be reissued to new irrigated acreage and half is “retired” with the water supply used for Leased Water.

The irrigation methods within PRID are gradually changing from flood to sprinklers which requires significantly less water. Consequently, the amount of Vallecito water being called by the irrigators is gradually decreasing over time.

The current income from Leased Water is about the same as the income from irrigation assessments and therefore reduces the annual irrigation assessment to about half of what it would be without the Leased Water. The reduced assessment allows the irrigators additional funds to invest in more efficient irrigation systems.

Though not an irrigation consideration, the change, if any, in depletion to the San Juan River basin River was also evaluated. The current depletion for the up to 3,000 acre-feet of irrigation water for miscellaneous uses is estimated to be 1,140 acre-feet (38 percent depletion rate for irrigation water) annually. The existing depletion was calculated using the Colorado Water Conservation Board's STATMOD hydrologic model of the Pine River Basin from 1929 to 2003.

Once fully converted to M&I uses, the depletion is estimated at 595 acre-feet (90.3 AF for the existing 650 AF of Leased Water, 225AF for the future minor uses, and 280.5 AF for the future Third Party uses); this depletion estimate is based on past depletion patterns but may not be reflective of future patterns. While it is contemplated that a reduced depletion would occur if water was converted from irrigation to M&I uses, this assessment assumes that the historic depletion of 1,140 af would continue because the proposed Contract simply allows for the conversion but does not implement it. There is no guarantee that any water would be converted.

5. DETRIMENTAL TO SENIOR WATER RIGHTS – Provision #3

DWR administers water rights in Colorado with the primary task of assuring that each water right is diverting according to its decree and in priority. Vallecito stores water under its decree for decreed purposes, including the Leased Water. DWR administers the filling of Vallecito and all other water rights on the Pine River and will assure that providing the Leased Water will not be detrimental to senior water rights.

